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# Is There a Bilingual Mind?

Since the very beginning of the study of human cognitive development, language has been closely associated with almost all aspects of human condition. Many linguistic formulations have repeatedly pointed out the importance of “naming” or the power of “logos” (word) as the process by which “reality” and other “impressions” become organized into units of systems, concepts, or categories. Indeed, the process of naming, which is one of the important aspects of language, transforms the “world of sense impression, which the animals also possess, into a mental world, a world of ideas and meanings” (Cassirer, 1953, p. 28). Once accomplished, the individual is able to transcend the limitation of time and space (Ginsburg & Opper, 1969; Piaget, 1980) and venture into the world of thoughts and mental creations.

We see this transforming process in operation from the very beginning in the lives of children while learning to code their experiences, beginning with an unintelligible, nonsense babbling to a defined utterance. We are reminded of the tremendous joy experienced by parents when hearing the first utterance from their child—“dada,” “mom,” “baby,” “chair,” “spoon,” “the doggy,” “milk.” It is quite an awesome experience to observe very young children attempting to communicate even nonverbally and, judging from Figure 2.1, quite effectively. It demonstrates the powerful and ingenious ways the intention to communicate finds expressions even when verbal skills are still at an embryonic stage.

At a later point, more complex sentences are uttered and the child’s increasing awareness of complex sentence construction becomes evident. According to Clark (1978), children provide evidence of linguistic awareness at a very early age. First, they are able to repair their own speech, then they are able to correct the utterances of others, and finally they are able to provide an explanation as to why certain sentences are possible and how they should be interpreted (Galambos & Goldin-Meadow, 1990). According to these authors, this ability to verbalize metalinguistic judgments is not accomplished until the age of 6. By age 4, however, children already show sensitivity to linguistic markers in spontaneous repairs of their own speech (Galambos & Goldin-Meadow, 1990; Karmiloff-Smith, 1986). The progressive development of metalinguistic awareness observed in children reflects the increasing sophistication and maturation of brain functioning and the child’s enormous capacity for the organization of perception and experiences of various kinds. The development of categories and complex memories are then possible, leading to abstract concept formation. It is then possible for experience to be organized and internalized, to become, later on, a point of reference for the understanding and the processing of future experiences



FIGURE 2.1. Two children communicating.

(Mahler, Pine, & Bergman, 1975; Sullivan, 1953). The resulting enduring patterns of organization of these experiences along linguistic dimensions become part of the individual's cognitive structure that then guide the individual's overall function throughout its life.

The importance of this cognitive progression is highlighted, among others, by Piaget (Ginsburg & Opper, 1969; Piaget, 1980, 1995) and Vygotsky (1962) in their theories of cognitive development. According to Vygotsky, for instance, the abstract and symbolic aspects of language (the world of ideas and meanings) make possible the systematization and organization of experiences into categories. It is a verbal mediation position that views language as determining, mediating and thought-producing (Bucci, 1997). Following this line of thinking, Luria and Yudovich (1968) suggested that the most refined expression of the organizing and regulatory effects of language is observed in the way language tends to regulate and categorize the person's behavior. But language also tends to express and reflect the quality of internal organization. It was in this context that assessing the individual's internal cognitive, emotional, and belief patterns became essential in Albert Ellis's work on the individual's belief system (2001) and in Freud's analysis of linguistic contents (1940).

Underlying Luria and Yudovich's formulations is the idea that different categorizations and organizations of the experience may take place with different languages. That is, different cognitive and affective activities may be activated by or may be associated with different languages, depending upon the inherent qualities of these languages. Such formulation found some validation in the works of Whorf (1956), Ervin, (1964), Marcos, Alpert, Urcuyo, and Kesselman (1973)

and others. Whorf, for instance, concluded from his comparative study between the Hopi and European languages, including French and English, that the qualities of a language have a determining effect on the way people organize their perception and interpret the world around them. Thus, he discovered that the language of the Hopi processes the idea of “time” and “space” very differently than does the English language. He, then, concluded that these linguistic differences must have a direct bearing on the way the speakers of these languages perceive and interpret the world (*Weltanschauung*). This is what is known as the “Sapir–Whorf’s hypothesis.” It is a linguistic determinism but with a dialectical paradigm that suggests that as one thinks so one feels and as one feels so one thinks. Once words have been created to refer to an experience (e.g., time, space, different kinds of snow) these concepts then acquire an organizing power that guides the individual’s cognitive process. Thus, the individual is forced to sacrifice whatever variation to the perception that the agreed-upon word is supposed to elicit in order to ensure some level of communication with members of its group. An example of this could be the word “apple” that could mean a green or a red apple, an apple that is small and bitter or juicy and sweet, depending on the individual’s experience with apples in the context of his or her cultural and linguistic group membership. Thus, saying that “I just ate a apple,” may elicit in the listener only “the apple” of his or her experience, not necessarily the intended message of the speaker, unless additional information is provided.

Studies frequently cited in support of Sapir–Whorf’s hypothesis are studies by Ervin (1964), Kolers (1968), and others. Ervin, for instance, observed in her study of thematic apperception test (TAT) cards that her French–English subjects responded differently in the two languages. Responses to the TAT cards in English expressed more achievement themes; responses in French, on the other hand, contained stories with themes involving verbal aggression against peers, autonomy, and withdrawal from others. Similarly, Kolers (1968) and Krapf (1955) observed that different sets of associations, mental representations, memories, and affective responses were elicited in their subjects depending upon the language utilized.

## The Bilingual Process in the Context of the Cognitive Development

Because of the crucial role language is assumed to have in cognition and emotion, it is not surprising to see that many psycholinguists are focusing their attention on the effect of bilingualism (the acquisition of two linguistic codes) on processes such as perception, memory, intelligence, learning, and personality formation more and more. Bilingualism is, indeed, a unique phenomenon whose complexity cannot be fully understood by just looking at the way language is developed in general. For bilinguals, two linguistic codes are available at all times to organize and process their perceptions of various kinds (visual, auditory, olfactory, tactile, cutaneous–kinesthetic, see Figure 2.2). So a child who is interacting with its monolingual mother and with whom it learns to communicate and organize

its needs (e.g., hunger, physical pain, need for warmth, protection, to have its surrounding explained) and different feelings (e.g., wonderment, feeling of well-being, love, happiness, sadness, discomfort) develops specific linguistic modes of organizing and categorizing these experiences. These organizations and categorizations remain closely connected to the language of the interaction; by that I mean that the unique linguistic (monolingual) characteristics of the family unit where the child grows become encoded in the child's language. What happens, then, when this child now goes to another situation (such as school) where a different language is now utilized for learning and organizing experiences that occur in that context? What happens to these linguistic-specific organizations and categorizations with regard to the whole communication process? Eventually, the child develops ways to organize the different learnings coming from the different sources into its cognitive structure.

What is clear is that the categorization of the experience in the bilingual context and the resulting cognitive structure brings about additional challenges/opportunities to the bilingual individual, not only at the initial stage of language learning but throughout his or her dealing with the world. The understanding of this phenomenon is even further complicated by the fact that not all experiences can be coded linguistically since some of the experiences can remain organized at a prelinguistic or presymbolic level. This is particularly the case for experiences occurring before the symbolic nature of language is developed and acquires the organizing capacity that is possible under a more mature neurological/physiological development. We have seen this phenomenon in operation when a bilingual person is unable to communicate an experience in either language and is left with a general feeling that there is something that cannot be totally and fully expressed in any of the languages. We will come back to this issue when we discuss the role of language in the psychological and emotional development in Chapter 8.

In her recent manuscript "Constructive processes in bilingualism and their cognitive growth effects" Johnson (2000) offers a sophisticated paradigm that seeks to explain the process referred to above in what pertains to the complexity of bilingualism in the context of the whole cognitive process. Following a dialectical-constructive theory, she suggests that the child organizes its experiences in "*knowledge structures*" that follow very specific organization. She distinguishes three basic sorts of knowledge structures that organize the individual's basic cognitive structure: 'infralogical,' 'logological,' and 'linguistic structures.' Infralogical structures are "*particular-experiential structures*" or "*structures of the life-world*" with strong reference to what, I later refer to as, the "first level of experience organization" or experience related to the sensory-motor dimension (Figure 2.2). They are the substance of experience and represent actual objects or things in the environment. According to Johnson, they also include internal representations for distal objects whether they are organized as prototypes, scripts, or schemas. These structures organize the world senses or the concrete physical experiences the child has with its immediate environment. When the "*particular-experiential structures*" (infralogical structures) are

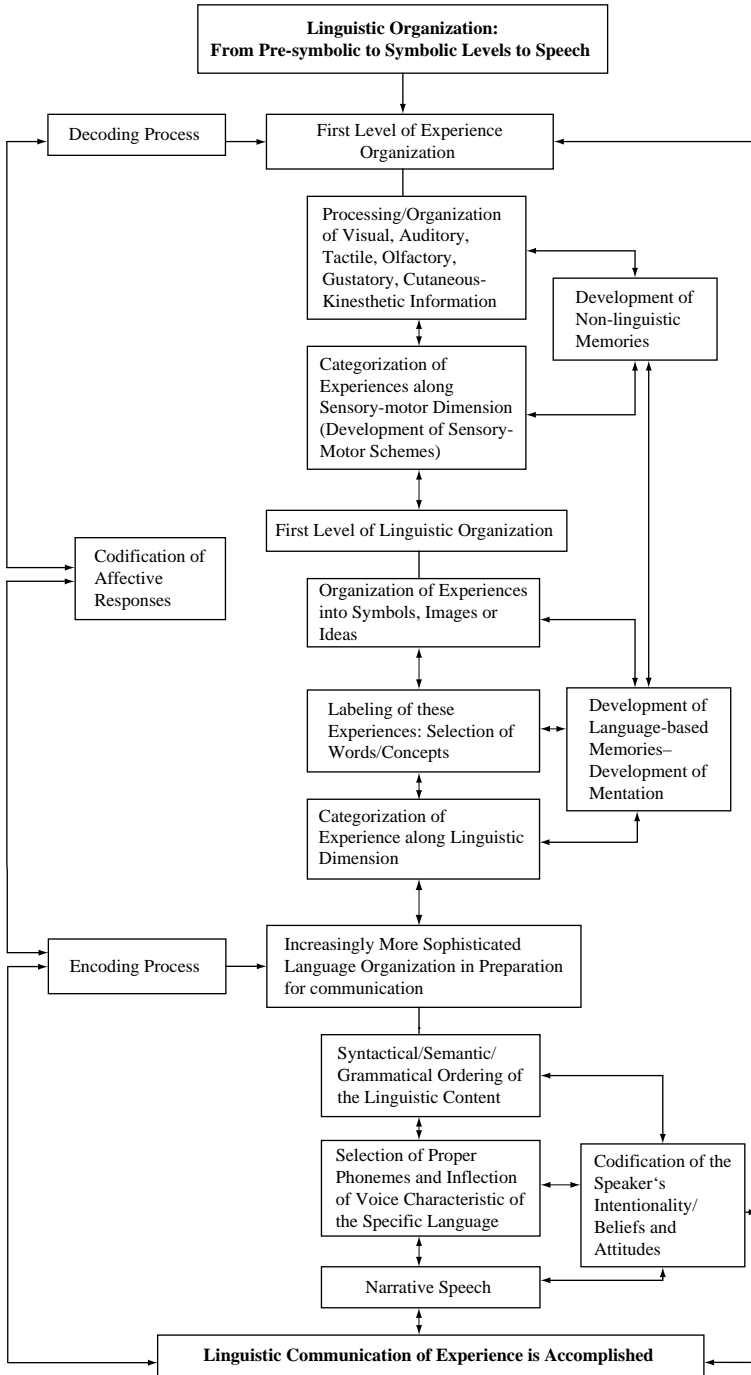


FIGURE 2.2. Process of linguistic organization.

encoded and organized into kinds (or classes, relations, or propositions), logological structures are said to be in place. According to Johnson, logological structures are of a higher order than their infralogical referents; “they are genetic kinds that often represent common characteristics of the infralogical token structures from which they are constructively abstracted” (p. 194). They embody invariances across types of objects or situations and hence they are more abstract structures, higher level or meta-organization, and as such are distinct from the infralogical structures that they can represent. Finally, linguistic structures encode invariances in the linguistic environments (e.g., lexical terms, grammatical relations) and are expected to mediate communication among humans.

According to Johnson, linguistic structures take their meanings from other structures. That is, they denote or symbolize logological structures that, in turn, describe infralogical structures. An important component of this development is that logological structures are not language-specific since, once acquired, “logological knowledge can be language-free . . . not reducible to linguistic structures” (p. 194) and can be constructed from the “bottom-up” (by internalized invariances across infralogical structures) or “top-down” (through instruction) through the mediation of language. Linguistic structures do not derive only from logological structures but can derive directly from infralogical structures (such as in the case of signals and many conventional symbols), which the child derives directly from the concrete direct experience with the environment (infralogical structures). An example of this could be the word “mom” that the child could use for organizing experiences related to its interactions with its mother or mothering environment.

The fact that we have a repertoire of experiences that are organized through the logological structures (or genetic-conceptual and hence not language-specific) and others organized through the infralogical structures (or particular-experiential and hence more directly related to the immediate experience) may explain how linguistic situations that are contextualized (e.g., contextualized language skills), or performance produced by structures that are easily cued by concrete features of the situation, are mediated by infralogical structures, while decontextualized information (e.g., decontextualized language skills or of cognitive academic proficiency) are mediated by logological structures. According to Johnson, bilingual information that is organized through and mediated by logological structures can be accessed through either language because it is organized in a metalinguistic manner, while information that is organized and mediated by infralogical structures tends to be language-specific.

According to Johnson (2000), experience with two linguistic systems leads the bilingual child to an early awareness of the arbitrary connection between linguistic forms and meaning. It also facilitates construction of certain kinds of executive structures that guide performance across certain kinds of tasks. These executive structures can be task or control executives and can be logological and infralogical structures. Executives are involved in mental planning and the temporal structuring of mental processing and action across all sorts of tasks.

Task executives monitor the individual's interaction with the environment, while control executives monitor the organismic internal resources or the allocation of cognitive capacities, such as mental attention. Infralogical executives tend to be situation-bound while logological executives are more genetic in nature and hence applicable across contexts.

The importance of Johnson's analysis is that it places linguistic development as part of the development of more comprehensive cognitive structures that provide the individuals with the necessary tools to respond to different challenges. As summarized by Johnson (2000),

What make sense of experience by means of our infralogical (particular-experiential) structures (i.e., we are always in context). Thus, language as communication has its reference (is validated) at the infralogical level; it is difficult to understand communication that does not make contact with our experience... Developmentally, language starts out having a signalic function... Language also gradually takes on a *symbolic* function, that is, it allows us to entertain the idea of the referent, without making the referent present... Logological structures (the logic of thought) are also symbolic in this sense. (p. 198)

In Figure 2.2 we attempt to provide another view or a schematic representation of this cognitive-linguistic process referred to above but with more emphasis on the linguistic development. Figure 2.2 describes a model of cognitive-linguistic organization from presymbolic to symbolic levels, which finally result in speech production. It is meant to be a dynamic, highly coordinated, efficient, and interdependent model with no reference to the speed with which these functions are normally accomplished. There are multiple loops of interactions assumed to be operative at all times in the communication process and that affect the nature and quality of the final product. It is a synchronic process where the early sensory motor (prelinguistic) stages provide the necessary basis for ultimate developmental accomplishment; that is, the development of mentation and linguistic organization. Many of these functions become automatic over time.

The importance of synchronization of the different aspects of the acquisition of learning (from sensory-motor stages to the development of progressively more complex schemes, to the formation of language proper) was amply discussed by Piaget (Ginsburg & Opper, 1969; Piaget, 1980, 1995) and Locke (1994) who provided specific evidence in this regard. Our effort at this point is only to provide the reader with a visual example, albeit simplistic, of the complexity of the information processing that takes place in each individual in relationship to his or her languages. It implies the linguistic learning that occurs prenatally, described by Locke (1994), and that explains the child's early ability to recognize the mother's voice. According to Locke the child is already involved in the linguistic process in the final trimester of pregnancy when the fetus is capable of hearing the mother's voice. What then follows is a progressive interplay among the different areas that have a direct or indirect impact on the child's final development. This includes the neurological development that makes it possible for the child to process and remember different kinds of stimuli, the maturity

of the language sites in the brain, the maturity of the vocal cords and mouth apparatus, the development of the ability to categorize perceptions of various kinds, etc. (Fagen & Prigot, 1993; Luria, 1973, 1981). Thus, at the beginning a child tends to look around its surroundings and eventually begins to babble and repeat sounds made by those around it. At the end, the child learns to say specific words and simple sentences related to its immediate survival (milk, mom, dad, “mom, milk”, “my tomy hurts,” etc.) with more and more clarity. With the locomotor development (kicking response and the capacity to crawl and then walk), the child develops an array of physical reactions to stimuli in the environment [the kicking response studied by Fagen (1980) and Fagen and his team (1984, 1985, 1990, 2001) in response to different presentation schedules of specific stimuli]. It later starts to venture into other areas that had, up to that point, only been accessible in the context of its interaction with the mother and others who would have carried the child from places to places as they went about their business; and thus begins the process of cognitive/emotional independence (Mahler et al. 1975). It is at this point that the child, although relying, for the most part, on infralogical structures to organize its experience, it also begins to organize its experience in ways that can be stored in memory (object constancy) and categorized at a more abstract mode. This is what Johnson refers to as the beginning of experience organization along the dimension of logological structures. Affects are thus developed in this context and become intimately interconnected with the cognitive development, becoming part of the progressive organization of behavior. This process was amply described by Piaget in his description of the cognitive/affective development of the child (Ginsburg & Opper, 1969; Piaget, 1954, 1995) and Mahler, Pine, and Bergman (1975) in what pertains to the emotional development in the book *The Psychological Birth of the Child*.

The role of language in the organization of experience was also eloquently described by Sullivan (1953) in his description of the nature of the human experience. His description has some similarities to the one provided by Johnson discussed above, although he was more interested in a description of experience in terms of the emotional development and the development of the personality than a cognitive development. According to Sullivan, experiences are organized along three basic dimensions: the prototaxic, parataxic and syntactic modes (Figure 2.3). Prototaxic refers to an experience that occurs before symbols are

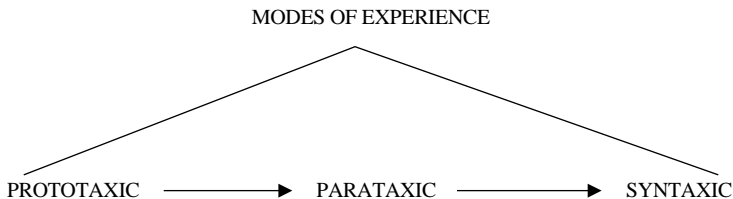


FIGURE 2.3. Sullivan’s mode of experience organization.



used; it is the “discrete series of momentary states of the sensitive organism,” “it is the rough basis of memory . . . the crudest, the simplest, the earliest, and the most abundant mode of experience” (p. 29). When the child develops symbols as a private and autistic way to communicate these experiences, a parataxic mode is thought to be in place. When these symbols and levels of communication take on a more mature organization that makes possible the easy communication between and among individuals, a syntactic mode is said to be in place. Thus, a syntactic mode allows the experience to be communicated to another person. It would be a great mistake to assume that no cognitive organization is in place at the prototaxic or parataxic linguistic organization (Figure 2.3), because it would overlook the complexity of cognitive development prior to the solidification and maturity of the linguistic dimension. In fact, there is evidence of complex thought and learning processes in prelinguistic or prototaxic/parataxic infants (Fagen, 1980; Fagen & Prigot, 1993) and even in adults (Bucci, 1997), as discussed earlier.

In trying to provide further clarification of the complexity of language operation, Friederici (2001) also suggests similar paradigm as proposed by Sullivan but following a more linguistic conceptualization. She suggests that language processing is based on three knowledge sources (semantics, syntax, and phonology, including prosody) that must be activated and well-coordinated in time to guarantee normal language production and comprehension. It is an enormous task. These sources are the essence of the individuals language system and are organized along the procedural (implicit) memory structure, while verbal communication, or pragmatic aspects of the language and metalinguistic knowledge, are organized along declarative (explicit) memory structure (Paradis, 2003). One can then appreciate that the tremendous amount and complexity of timely coordination referred to in the case of a monolingual individuals language processing becomes even more so when more than one language is involved.

## No Single Theory can Explain Cognitive Development in a Bilingual Context

The point to be made here is that language processing and the linguistic codification of experience in bilingualism are rather complex and cannot be explained solely following a theory that stresses only one aspect of the linguistic phenomenon. Thus, if we were to follow Chomsky’s formulation (1957, 1965), often utilized to explain language development, how are we to apply his conceptualizations to language development in bilingual individuals? Chomsky’s emphasis on the innate and universal quality of language with regard to its syntax, which suggests that the individual already comes wired with a capacity for syntactical linguistic organization, leaves us with a number of questions regarding how this capacity influence language development in bilingualism and how other more complex cognitive processes can be explained. Are each of

the languages pre-wired in the bilingual individual and what parts of the brain are pre-selected for the operation of the bilingual's two languages? How can Chomsky's formulation explain the findings discussed later in this chapter, that different parts of the brain are involved in language function in bilinguals as a function of when in their development the languages were learned and the level of linguistic proficiency acquired? In fact, Chomsky's formulation has been criticized as not comprehensive enough to explain all important aspects of language (Bucci, 1977), and this is particularly the case when referring to bilingualism. Vygotsky's linguistic mediation paradigm (1962) emphasizes, on the other hand, the more dynamic aspects of language. He suggests that language mediates and determines human behavior and all cognitive processes. Mental development is seen as the result of word meanings that come to dominate all human mental processes (Rieber & Wollock, 1997).

In the final analysis, language can only be the product of an interactive and dynamic process combining inherent linguistic and cognitive qualities with the individual's desire to communicate, in the context of the personal and interpersonal realm. Or, as further delineated by Bucci (1997), "communicative language arises from application of general cognitive capacities to the function of communication over vocal and auditory channels" (p. 79). And the fact that we have evidence, in the works of Ervin (1964) and Ervin and Osgood (1954) referred to earlier, that language also tends to mediate perception, confirms the need to maintain a view of language that incorporates these different perspectives.

What make language so powerful are the symbolic complexities that are possible and that eventually result in the transmission of a thought. A thought is a solidification of an intricate process, resulting in the development of an organized schema that encapsulates an experience or set of experiences, an idea or set of ideas, a feeling or set of feelings, etc. According to Bucci (1997), "symbols are entities that refers to other entities and have the capacity to be combined in rule-governed way, so that infinite array of meaningful units can be generated from a finite set of elements" (p. 77). Once the symbols are generated, they function as organizing principles of experience. Thus, images, visual stimuli, and words can then serve as a guiding force for specific experiences (Fagen & Prigot, 1993; Ginsburg & Opper, 1969; Javier & Marcos, 1989).

In the case of bilingual individuals, the symbolic complexities of language become even more powerful. We may be able to visualize the complexity of the bilingual process by imagining a linguistic organization side by side to the one depicted in Figure 2.2. The one depicted in this figure describes a monolingual process. In the bilingual process, we assume that two languages are expected to become involved in the cognitive process, even in the prelinguistic organization level, but more clearly so from the first level of linguistic organization on. We suspect that the extent to which the bilingual's languages will operate more or less independently from one another with regard to these different aspects of language depicted in Figure 2.2 is a function of when and how the two languages are acquired and organized, the level of proficiency in the two languages, and the language function under consideration (Johnson, 2000).

## Evidence of the Bilingual Mind?

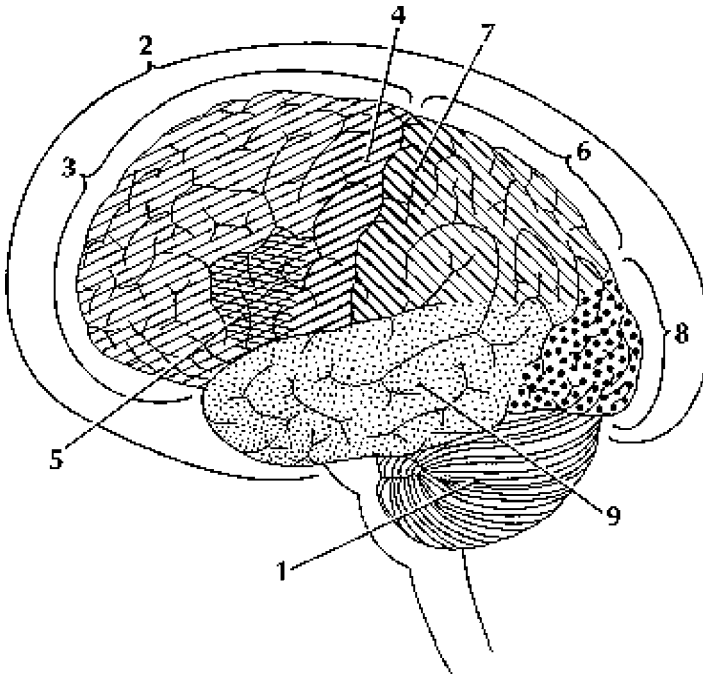
The confusing and controversial nature of the evidence usually presented in support of the existence of a different and distinct brain organization in bilingual individuals does not allow us to make a definite pronouncement in this regard, leaving us instead with a number of questions in need of more rigorous research paradigms. Paradis (2003), one of the most ardent critics of the existent literature on the subject, finds problems in much of the research literature in this regard at the level of conceptualization, definition of the constructs being studied, and methodology. While recognizing the importance of the need of more rigorous research paradigms, there are data coming from different sources that should be considered in determining the extent to which bilingualism does or does not result in a different linguistic, cognitive, and emotional organization and hence these will be presented at this point.

For instance, the evidence supporting the distinctive characteristics of the bilingual mind continues to mount (Albert & Obler, 1978; Hahne, 2001; Perani, Paulesu, Galles, & associates, 1998). The assumed separateness of the bilingual languages with regard to linguistic organization and processing has found some support in various fronts (Albert & Obler, 1978; Centeno & Obler, 2001; Ervin, 1964; Hahne, 2001; Lambert, 1972; Lambert, Havelka, & Crosby, 1958). In fact, several findings support the view of the distinctive function of the bilingual brain under certain conditions. For instance, Hahne (2001) concluded from a comparison of studies that attempted to decipher the neural substrate in the bilingual languages that the proficiency level in the second language is the most important variable. For low-proficiency participants, different brain areas are recruited for processing the two languages. For the high-proficiency participants, on the other hand, identical neural substrate is recruited.

When looking at semantic processing during reading, Ardal, Donald, Meuter, Muldrew, and Luce (1990), using the "event-related brain potentials" technique or ERPs, which according to Friederici (2001) provides "a temporal resolution in the millisecond domain with a coarse spatial resolution" (p. 238), found that all participants displayed an N400 component. Its latency, however, was shortest in monolinguals and delayed by 40 ms in bilinguals' second language, as compared with their performance in their first language (Hahne, 2001). Hahne (2001) also cited other similar studies with comparable findings, such as the one by Weber-Fox and Neville (1996) that found that all the bilingual groups studied by these authors displayed an N400 effect, but the peak latency was delayed for the participants who acquired the second language after the age of 11. In a study by Hahne and Friedirici (2001 and also summarized in Hahne 2001 manuscript) that assesses semantic and syntactic processing during auditory sentence comprehension in a group of Japanese native speakers who learned German after the age of 18, it was found that the ERPs of the second language learner differed from those of native listeners with regard to the processing of correct sentences. The most remarkable differences were observed for sentences containing phrase structure violations. Specifically, in contrast to native listeners,

the bilingual learners showed “neither a modulation of the early anterior negativity nor of the late positivity” (Hahne, 2001, p. 253), suggesting difficulty in sentence processing and integration. Following a different methodology, Hoover (1992) also found different processing strategies in his Spanish/English bilinguals.

Other findings have also emphasized right hemisphere involvement in the case of bilingual in comparison to monolingual (Albert & Obler, 1975, 1978) and differential brain involvement in the bilingual two languages, in keeping with previous findings reported earlier. (Figure 2.4 provides a visual presentation of



1. Cerebellum
2. Cerebrum
3. Frontal lobes
4. Motor area
5. Broca's area
6. Parietal lobes
7. Sensory areas
8. Occipital lobes
9. Temporal lobes

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FIGURE 2.4. The architecture of the Brain.

the different parts of the brain that we will be referring to in the context of our discussion. It is a cross-section showing the left part of the brain.) For instance, Ojemann and Whitaker (1978) found that the sites in the center of the speech areas were involved in both languages, while sites in the frontal and parietal cortex were involved in only one of the languages. These authors employed a cortical electrical stimulation technique, placing electrodes in the various parts of the brain for the purpose of assessing the extent of naming disruption in two bilingual subjects.

They found that the right hemisphere was involved in naming in one of the subjects. A differential brain localization was also observed in Chinese–English bilinguals by Rapport, Tan, and Whitaker (1983) in a study discussed by Centeno and Obler (2001). Using cortical electrical stimulation, they observed that language functions were differentially localized along the left perisylvian area. Paradis (1993, 2004) later suggested that these findings are suspicious because the language-specific areas reported only covered the periphery of the language zone and it might be that the stimulation utilized interfered with language only some of the times, with the electrode field falling just outside the language zone at other times. Similarly, it can be said that the findings reported by Albert and Obler (1978), that different aphasic conditions were found in their subjects, were a function of a differential recovery pattern. He explains the different recovery patterns that are observed in aphasic patients as being a function of two kinds of memories that tend to guide language function: declarative and procedural memories. Declarative (explicit) memory structure is more prevalent in second language function and is bilaterally represented. According to Paradis (1993), the fact that declarative memory is more impacted by age and some brain deterioration (such as in Alzheimer’s disease) may explain the differential language behavior observed in bilingual individuals in these contexts.

Studies on bilingual memory provide us with important information regarding the question of the bilingual mind. For instance, some studies on memory storage in bilinguals indicate that bilingual memory may be represented by two functionally independent storage and retrieval systems, one for each language (Kolers, 1963; Tulving & Calotta, 1970). Others support an interdependence storage and suggest that all information exists in a single memory storage (Lopez & Young, 1974; Thorson, 1980). A more comprehensive explanation on the way information is stored was offered by Hines (1978). He concluded from his study that “the situation is far more complex than the interdependent or independent models would suggest. Within a given person’s memory, information may be stored in both an independent and an interdependent manner, depending on the type of memory representation (e.g., orthographic, phonemic, or semantic) that is being examined . . . all bilinguals, regardless of the nature of their second language learning experiences, would share a common memory structure with semantic representations being interdependent and orthographic and phonemic representations being independent” (pp. 23–24). Hines even postulated a unitary common memory structure shared by both languages, with

semantic representation being interdependent and orthographic and phonemic representations being independent. Again, the conclusion about common versus independent memory systems refers more to the nature of memory structure (declarative vs. procedural) subserving a specific language system/function being studied. As discussed earlier, phonology, morphology, syntax are subserved by procedural memory and isolated words (semantic) are subserved by declarative memory and hence are less focalized in their representation (Paradis, 1994, 2003).

What is clear with regard to studies on the bilingual memory is that the organization of information along a linguistic dimension in a bilingual process appears to be different as compared with a monolingual process. It is experienced as different by the bilingual individual under certain conditions. Thus, the argument put forward by Paradis (1993, 2004) about the two types of memory structures guiding language function in general and the way these structures are reflected in the bilingual individuals as an argument against findings of the apparent brain lateralization and more or less right hemisphere involvement does not completely explain the report of many bilinguals that something is experienced as different when they interact in one or another of their languages (Javier, 1996). Thus, in answering the question as to whether or not there is a bilingual mind, some of the evidence clearly points to the fact that a bilingual person does seem to organize his or her experiences cognitively and emotionally differently in the two languages and that these differences tend to show in obvious and more subtle ways. Because of the centrality of this basic quality of the bilingual experience, we will continue to address this issue more fully in ensuing chapters and, most immediately, in relationship to a discussion on linguistic organization and bilingual memory.

The most powerful evidence in support of the bilingual mind, however, comes from clinical reports of patients who feel that major components of their experiences seem to be language-specific in terms of their ability to retrieve them. Like the patient discussed by Quiñones (2007) who refused to speak her primary language (Spanish) and tried to incorporate an identity that was closer to her ideal image of a successful woman in an English-speaking community. Her style of dress and mannerism, taste of music, and food all changed to be consistent with this acquired identity. She was afraid to speak in Spanish because she did not want to associate with her past and to have to feel the same way she felt when she was emotionally neglected and abandoned by her mother. Thus, her language use was influenced by her need to protect herself from painful memories that she felt were closely associated with Spanish. It is clear that for this patient the two languages provided her with two different alternatives to organize her experience and her personal identity. This is in keeping with the report of adopted children who report not to remember their native language and not to remember anything of their experience associated with that language. Their memory seems to begin with the beginning of the new experience with their adopted families where a new language (second language) was acquired, which is now used to organize and communicate their experiences.

We can tentatively conclude from all these findings that there is some evidence supporting the view that a bilingual individual does tend to process information differently than does the monolingual with regard to different aspects of language processing (semantic and syntactic). The evidence supporting the view that differences in processing in language-specific information found among bilinguals are related to differences in the way a bilingual and a monolingual brain processes information is less clear.

